

Applic. No.: 10/686,849

Amdt. Dated January 17, 2006

Reply to Office action of October 14, 2005

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of claims:

Claim 1 (currently amended). A contact configuration, comprising:

a semiconductor body of semiconductor material in a monocrystalline phase, said semiconductor body having one of a trench component and a planar component formed therein, said component being selected from the group consisting of a diode, a bipolar transistor, a MOSFET, and an IGBT;

a metalization layer formed of a metal selected from the group consisting of aluminum, chromium, and aluminum/chromium; and

a layer of said semiconductor material in a substantially amorphous phase disposed between said semiconductor body and said metalization layer, for forming an ohmic contact between said metalization layer and said semiconductor body;

said semiconductor material being silicon and said layer being a layer of amorphous silicon doped with hydrogen.

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Claims 2-4 (cancelled).

Claim 5 (previously presented). The contact configuration according to claim 1, wherein said silicon semiconductor body is n-conducting in a region of said layer of amorphous silicon.

Claims 6-7 (cancelled).

Claim 8 (previously presented). The contact configuration according to claim 1, wherein said silicon semiconductor body is p-conducting in a region of said layer of amorphous silicon.

Claim 9 (original). The contact configuration according to claim 1, wherein said layer of amorphous semiconductor material has a thickness in the order of magnitude of nanometers.

Claim 10 (original). The contact configuration according to claim 9, wherein said thickness of said layer lies between 2 and 100 nm.

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Claim 11 (original). The contact configuration according to claim 1, wherein said layer of amorphous semiconductor material has a doping of between 10^{15} and 10^{16} charge carriers per cm^3 .

Claims 12-14 (cancelled).

Claim 15 (original). The contact configuration according to claim 1, which comprises a field stop zone in said semiconductor body, said field stop zone adjoining said layer of said amorphous semiconductor material.

Claim 16 (original). The contact configuration according to claim 1, which further comprises an additional layer in said semiconductor body in a region of said layer of amorphous semiconductor material, said additional layer forming an emitter.

Claim 17 (original). The contact configuration according to claim 16, wherein said additional layer and said semiconductor body are of a common conductivity type.

Claim 18 (original). The contact configuration according to claim 16, wherein said additional layer and said semiconductor body having mutually opposite conductivity types.

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Claim 19 (original). The contact configuration according to claim 16, wherein said additional layer is doped so weakly that, without said layer of amorphous semiconductor material, said additional layer forms one of a Schottky contact or an ohmic contact with a relatively high contact resistance.

Claim 20 (original). The contact configuration according to claim 1, wherein said layer of amorphous semiconductor material is formed on at least one of a front side and a rear side of said semiconductor body.

Claim 21 (original). The contact configuration according to claim 20, wherein said layer of amorphous semiconductor material is formed to locally attenuate an injection of charge carriers in critical component regions.

Claim 22 (original). The contact configuration according to claim 1, wherein said layer of amorphous semiconductor material is locally recrystallized.

Claim 23 (original). The contact configuration according to claim 1, wherein in said amorphous semiconductor material is silicon carbide.

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Claim 24 (withdrawn - currently amended). A method for producing the contact configuration according to claim 1, which comprises:

providing a semiconductor body formed of silicon in a monocrystalline phase, the semiconductor body having one of a trench component and a planar component formed therein, the component being selected from the group consisting of a diode, a bipolar transistor, a MOSFET, and an IGBT;

applying amorphous silicon doped with hydrogen on the semiconductor body by a process selected from the group consisting of sputtering, vapor deposition, and glow discharge;

applying a metallization layer on the layer of amorphous silicon doped with hydrogen, the metallization layer being formed of a metal selected from the group consisting of aluminum, chromium, and aluminum/chromium; and

subsequently subjecting the amorphous silicon doped with hydrogen to heat treatment and forming the contact configuration according to claim 1.

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Claim 25 (withdrawn). The method according to claim 24, which comprises performing the heat treatment at about 350°C to 450°C.

Claim 26 (withdrawn). The method according to claim 24, which comprises sputtering in a hydrogen-containing atmosphere.

Claim 27 (withdrawn). The method according to claim 24, which comprises performing the heat treatment in a hydrogen-containing atmosphere.

Claim 28 (withdrawn). The method according to claim 24, which comprises locally recrystallizing the amorphous layer of silicon at temperatures above about 600°C in component regions.

Claim 29 (withdrawn - currently amended). A method for producing the contact configuration according to claim 1, which comprises:

providing a semiconductor body formed of silicon in a monocrystalline phase, the semiconductor body having one of a trench component and a planar component formed therein, the component being selected from the group consisting of a diode, a bipolar transistor, a MOSFET, and an IGBT;

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forming an amorphous silicon in the semiconductor body by
damage formation;

doping the amorphous silicon with hydrogen; and

applying a metallization layer formed of a metal selected from
the group consisting of aluminum, chromium, and
aluminum/chromium on the layer of amorphous silicon doped with
hydrogen and producing the contact configuration according to
claim 1.

Claims 30-31 (cancelled).

Claim 32 (withdrawn). The method according to claim 29, which
comprises introducing an additional layer into the
semiconductor body in a region of a layer formed of amorphous
silicon.

Claim 33 (withdrawn). The method according to claim 32,
wherein the additional layer is weakly doped.

Claim 34 (withdrawn). The method according to claim 29,
wherein the damage formation is effected by implantation.

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Claim 35 (withdrawn). The method according to claim 34, wherein the implantation comprises implanting elements of the third period of the periodic table of elements.

Claim 36 (withdrawn). The method according to claim 34, which comprises implanting with an implantation dose of about $5 \cdot 10^{14}$ cm^{-2} to $1 \cdot 10^{16}$ cm^{-2} .

Claim 37 (withdrawn). The method according to claim 29, which comprises locally recrystallizing the amorphous layer of silicon at temperatures above about 600°C in component regions.